ESS 474

Fall 2024

**Phytoplankton ID Lab**

Date: Friday September 27, 2024

Write up due: Wednesday October 2, 2024

The structure of photosynthetic phytoplankton populations in aquatic ecosystems is dynamic and constantly changing in species composition and biomass distribution. Changes in phytoplankton species composition and biomass may affect photosynthetic rates, assimilation efficiencies, rates of nutrient utilization, grazing rates, etc.

**Procedure**

1. Look at sample under dissecting microscope.
2. Transfer *one* drop of sample from the petri dish with a pipette to a slide, and cover it with a slip.
3. Set the slide on a compound microscope (x 40 recommended). Count and record all individuals in **Table 1.**
4. Repeat this 4 times.
5. For one slide, record all individuals in **Table 2.**
6. Answer summary questions and assemble a clean and polished final report.

Algae ID: <https://www.landcareresearch.co.nz/tools-and-resources/identification/freshwater-algae/identifications-guide/>

**Reference**

Wetzel, R. G. and G. E. Likens. 2000. Limnological Analyses. Springer, New York.

**Rubric**

|  |  |  |
| --- | --- | --- |
| Category | Description | Points |
| Tables | Table 1 and 2 are completed to the best of the student’s ability | 5 |
| Questions | All questions are answered with attention to detail and all statements are supported with reason and evidence | 8 |
| Overall quality | Submission is cleanly formatted and free of typos | 2 |
| **Total** | | 15 |

**Table 1:** Using the online keys provided, record counts of individuals.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Diatoms | Cyanobacteria | Eugleniods | Dinoflagallets | Unidentified Phytoplankton |
| Slide 1 |  |  |  |  |  |
| Slide 2 |  |  |  |  |  |
| Slide 3 |  |  |  |  |  |
| Slide 4 |  |  |  |  |  |

**Table 2:** For one slide, identify all individuals to the most specific classification possible (probably order  
or family). For additional individuals that are the same as those already identified, just add to the count in  
the right column. Best guesses are okay. Just do the best you can and nerd out a little. Add extra lines as  
necessary.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Individual | Class | Order | Family | Species | Count |
| 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  |  |  |  |  |
| Etc… |  |  |  |  |  |

**Questions**

1. In a few succinct sentences, describe the microscopic community you observed in the samples. Include jow many phytoplankton groups were you able to identify. Also include what kinds (broadly) of phytoplankton you could identify and how you determined their ID.
2. What was your Shannon index value? Is this considered high or low?

*Note: Feel free to use the DiversityIndices\_Lab.R script (modifying it as needed with your individual data) for this and the next question to speed up the calculations.*

1. What was your Simpson index value? Is this considered high or low?
2. How do you think phytoplankton diversity might be different in other months of the year?
3. These samples were collected at 1 meter in depth at ~7:00 PM from an eutrophic lake with Secchi Depth of 0.5 m. In a well written paragraph, hypothesize how changes in the aforementioned parameters (depth, time of sampling and trophic state) might impact the community assemblage you observed.